

## United States Patent [19]

Swartz et al.

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[54] **PORTABLE LASER SCANNING  
ARRANGEMENT FOR AND METHOD OF  
EVALUATING AND VALIDATING BAR  
CODE SYMBOLS**

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235/472; 250/568; 340/146.3 F; 350/6.6;  
350/6.7

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250/568, 569, 555, 556; 235/454, 455, 462, 463,  
472; 340/146.3 F, 146.3 Z, 146.3 SY

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[57] **ABSTRACT**

Laser light reflected from a bar code symbol pattern is detected by a photodetector mounted in a portable scanning head of a laser scanning system. By selecting appropriate threshold values on the analog signal generated by the photodetector, the analog signal is converted to a series of pulses, each pulse width accurately corresponding to the width of a bar from the scanned pattern. A plurality of functions can be determined from the series of pulses, each function being independently selected by keyboard entry from the head, displayed on the head, and/or recorded by a printer remote from the head. Single line or multiple line scans in two orthogonal directions relative to the pattern may be selected. A bimorph or speaker-type oscillatory element may be utilized as a miniature scanning element. Circuitry for synchronizing scanning along both axes, and for generating a signal to drive the bimorph in a uniform, constant velocity manner is also disclosed.

**37 Claims, 18 Drawing Figures**

